MULTIMEDIA AS AN INTERACTIVE PLATFORM IN LEARNING VOLCANOES IN SOCIAL SCIENCES AMONG UPPER PRIMARY STUDENTS – AN EXPERIMENT

By

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ABSTRACT

Instructional technology is a growing field which uses technology as a means to solve teaching and learning challenges, both in the classroom and outside the classroom that is in distance learning environments. Multimedia is an interactive instructional technology used in the classroom for teaching learning process has a wide significance to the learners as well as teachers. Multimedia means the integration of continuous media (e.g. audio, video) and discrete media (e.g. text, graphics, images) through which the digital information can be conveyed to the user in an appropriate way. In the present study, the investigators have developed and standardized the Multimedia Package in non-linear way using Macromedia Flash MX software for learning Volcanoes in Social Sciences for upper primary students. The ADDIE model was considered to develop and standardize the Multimedia package. In this study, the experimental method was adopted by the investigators. The Parallel Group Design was chosen in this study in which the Control and Experimental groups were the two groups of parallel group design. Fifty students studying VIII standard from Government Higher Secondary School at Vellalore Panchayat in Coimbatore were randomly selected as sample for the study. The fifty students were divided into two groups (i.e.) Control group and Experimental group. Each group comprised of 25 students. The pre-test and post-test were conducted for both groups. Finally the study proves that the learning outcome through multimedia package is higher than the traditional method. Hence, it concludes that the multimedia package developed and standardized for learning volcanoes in social sciences is an effective tool and the same can be implemented to enhance the learning activities of the students.

KeyWords: Multimedia Learning, Self-Learning Strategy, Interactive Learning, Interactive Instructional Technology.

INTRODUCTION

Educational Technology is relatively new field which aims at solving problems of teaching and learning. Hardware and software are two structural components of this technology and multimedia is an important aspect related to it. In education, instructional technology is "the theory and practice of design, development, management and evaluation of process and resources for learning". The purpose of instructional technology is the promotion of learning. It is consisted of two major parts. One is teaching technology and another is learning technology. In the education industry, the term "instructional technology" is frequently used interchangeably with "educational technology" (Sampath, K. et. al., 2004).

In the traditional teaching and learning process, a single media (text) is used as the instructional media and the presentation of the educational content or the Instructional Communication Process (ICP) is in a linear fashion. In the pre technology education context, the teacher is the sender or the source, his or her educational material is the information or message, and the student is the receiver of the information. In terms of the delivery medium, the educator can deliver the message via the "chalk and talk" method and Over Head Projector (OHP) (Ken Neo & Mai Neo 2002).

With the introduction of technology, specifically multimedia technology into the classroom environment, the delivery of the information becomes a new

phenomenon (Vanaja, M. 2007). The use of technology and multimedia will clearly reinforce and strengthen the traditional ICP and change the roles of the instructors and students. Now, the teacher becomes the director of the knowledge – access process and will make a difference in the integration of the media into this process.

Multimedia learning is interactive and can illustrate a concept through attractive animation, sound and demonstration. Thus, multimedia means a combination of more than one medium in a single communication for the same purpose. Navigational links can be added to the instructional content to enable the student to interact and to move around the content with ease in the way he/she likes best (Saxena, Mishra, & Mohanty,2006). They allow students to progress at their own pace and work individually or problem solve in a group. So, the students learn independently at their own pace which is called "self learning". The multimedia package provides the self learning strategy in the educational field (Jonassen, et. al, 1999).

The main feature of any multimedia application is its human interactivity. This means that it is user friendly and basically caters to the commands the user dictates. For instance, users can be interactive with a particular program by clicking on various icons and links, the program subsequently reveals detailed information on that particular subject. The above theme can be considered to be a GUI (Graphical User Interface). The multimedia system supports the interaction with more than one of the types of text, graphics, video or audio.

Multimedia package used in the classroom for teaching learning process have a wide significance to the learners as well as teachers. It provides a good motivating force to the students. Verbalism both printed and spoken does not prove much effective in the process of teaching and learning. Raymond Wyman (1967) says, "we (teachers) tell students and we provide them with written material so much of the time. Words are wonderful. They are easily produced, reproduced, stored and transported but the excessive use of words can result in serious problem, chiefly, the problem of verbalism (using or adopting words or phases without considering what they mean) and forgetting". The multimedia package helps in solving the problem of verbalism by providing picture, animation, video etc in teaching and learning. It arouses the interest of learners and helps the teachers to explain the concepts easily. Hence, in the present study, the investigators developed the multimedia package in learning volcanoes in social sciences among upper primary students.

Objectives of the Study

In the present study the following objectives were formulated by the investigators.

- To develop and standardize the Multimedia Package on Volcanoes in Social Sciences for upper primary students.
- To find out the effectiveness of Multimedia Package in learning Volcanoes among upper primary students.

Research Design

Considering the objectives of the investigation, the Experimental Parallel Group Design (Control Group and Experimental Group) were adopted for this study. Fifty (50) students studying VIII standard from Government Higher Secondary School at Vellalore Panchayat in Coimbatore city were selected as sample for the investigation. The 50 students were divided into two groups (i.e.) Control group and Experimental group. Each group comprised of 25 students. The pre-test was conducted using CRT for both groups. After that, the multimedia learning environment was provided to the experimental group in the computer lab for learning about volcanoes whereas the traditional teaching was given to the control group. Then the post-test was conducted using the same CRT (but the order of items and alternatives were changed) for both groups. Thus the collected data were used for data analysis to arrive the findings and conclusion.

Research Tools

In this study, the following research tools were developed and standardized by the investigators. The research tools were,

- Multimedia package was developed and standardized by the investigators to learn volcanoes in social sciences by VIII standard students in Government Higher Secondary School.

- Criterion Referenced Test (CRT) was constructed and validated for pre- test and post-test of the students by the investigators.

Development & Standardization of Multimedia Package

In the present study, the multimedia package was developed by using Macromedia Flash MX software for learning volcanoes in social sciences for upper primary students. The ADDIE model was considered to develop and standardize the multimedia package. The acronym (ADDIE) stands for 5 phases namely Analyze, Design, Develop, Implement and Evaluate.

I – Analysis

In the analysis phase, the investigators found out the problem of the students studying through conventional method and the entry behavior of the students were discussed. To find out the entry behavior of the learner, the investigator administered pre-test to the students for both control group and experimental group students. After conducting the pre-test the answer sheets are evaluated by the investigators. The control group students got 42.6% of marks and experimental group students scored 43.8% of marks. Both the group of students have low achievement. The causes of low achievement might be unsuitable methods as found out by the investigators.

II – Design

After completing the analysis phase, the investigators described what are the hardware and software components needed and constructed the programmed learning material (PLM) for developing the multimedia package. The backward branching method was selected for this study. It has 13 main frames, each main frame has 3 sub frames and totally 39 frames were created by the investigators. This is the basic format for developing the multimedia package using Flash.

III – Development

After completing the PLM, this was applied to the Macromedia Flash MX software. The PLM is linear way. But, the Macromedia Flash is a non – linear way to provide multimedia platform to attract the senses of the learner for easy and joyful learning. This package contains related information and animated pictures about volcano, audio, video files and also it provides proper link to move from one frame to other frame.

IV – Implementation

After writing the Programmed Learning Material, it was given to the teacher who is taking class VIII to test whether the topic covered all the essential points and also tested whether the content have correct information regarding the factors. The suggestions were accepted and applied in the PLM. After developing the multimedia package, this was tried out by few individual learners and their reactions were found by slightly modifying this package for internal evaluation which is under the implement phase.

V – Evaluation

For the external evaluation, the multimedia package is used in the class room for teaching volcano to VIII standard experimental group students by the investigators. After that, the post-test was conducted and their achievement was found out through Criterion Referenced Test. From that, the experimental group students have secured 74.2% of marks in learning volcano through multimedia package.

Standardization of Criterion Referenced Test (CRT)

In this study, the Criterion Referenced Test or CRT is used to evaluate the students' learning outcome in volcano. It has 20 objective type questions with three options. Each question has one mark and the total mark is 20. 40% was for knowledge based questions, 35% for understanding level and 25% questions were used to test the students' knowledge of learning volcano in social sciences. The constructed tool was administered for the pilot study. For this, 14 VIII standard students from Government Higher Secondary School, Vellalore Panchayat, Coimbatore city were taken as samples for the pilot study. After that, the Item Analysis was employed to find out the quality of each item. Difficulty level (DI) and Discrimination Power (DP) were calculated using the formula [DP = R / N * 100)] and [DP = (RU – RL) / ½ * N] (Rajammal Rajagopal 2006). Finally, 14 questions or items were accepted as such and the rest of 6 items were modified.

Results and Findings

There are three hypotheses formulated in the study. The collected data were screened and analyzed using Paired

Sample t-test to test these hypotheses. The following tables are showing the results of mean score difference between pre and post test in control and experimental groups:

Hypothesis 1

There will be a significant mean score difference in learning Volcano between pre-test and post-test of Control group.

Table 1 shows the mean score difference in learning Volcano between pre-test and post-test of Control group. The pre-test mean is 42.6% and the post-test mean is 60.2%. According to Table 1, the calculated t-value 5.5963 is greater than the table value (2.064) at 0.05 level. Hence the hypothesis 1 is accepted and it can be said that there is a significant mean score difference in learning volcanoes between pre-test and post-test of Control group.

Hypothesis 2

There will be a significant mean score difference in learning volcano between pre-test and post-test of Experimental group.

Table 2 shows the mean score difference in learning volcano between pre-test and post-test of Experimental group. The pre-test mean is 43.8% and the post-test mean is 74.2%. It shows much difference in mean between pre and post tests. Further, the calculated 't'-value 7.4855 is greater than the table value (2.064) at 0.05 level. Hence, hypothesis 2 is accepted and it can be concluded that there is a significant means score difference between pre-test and post-test of Experimental group in learning volcanoes.

Hypothesis 3

There will be a significant mean score difference in gain score between Control group and Experimental Group in learning volcano.

Control Group	N	Mean	Standard Deviation	Df	t-value	Level of Significance at 0.05 level
Pre-test	25	42.6	10.07	24	5.5963	Significant
Post-test	25	60.2	19.82			

Table 1. Mean score difference in learning Volcano between pre-test and post-test of Control group.

Experimental Group	N	Mean	Standard Deviation	Df	t-value	Level of Significance at 0.05 level
Pre-test	25	43.8	7.11	24	7.4855	Significant
Post-test	25	74.2	17.87			

Table 2. Mean score difference in learning volcano between pre-test and post-test of Experimental group.

Gain Score	N	Mean	Standard Deviation	Df	t-value	Level of Significance at 0.05 level
Control Group	25	18.4	16.43	24	2.081	Significant
Experimental Group	25	30.4	20.30			

Table 3. Mean score difference in gain score between Control group and Experimental Group in learning volcano.

Table 3 shows the mean score difference in gain score between Control group and Experimental Group in learning volcano. According to Table 3, the gain score of control group has 18.4% as mean and the gain score of experimental group has 30.4% as mean. It shows that the experimental group is 12% higher than the control group. Further, the calculated 't'-value 2.081 is greater than the table value (2.064) and it is significant at 0.05 level. Hence, hypothesis 3 is accepted and it can be said that there is a significant mean score difference between Control group and Experimental Group in gain scores in learning volcanoes.

Conclusion

From the results and discussion, it is concluded that learning through multimedia is very effective than the traditional method of learning volcano in social sciences among 8th standard students. Hence it can be said that multimedia is a very effective tool for teaching and learning purposes. The major property of multimedia is its interactivity. The interactivity stimulates learning among the users. So, the investigators found that the multimedia is an interactive platform for learning volcanoes in social sciences among upper primary students. It helps in development of higher order thinking skills. Interactive multimedia encourages students to seek information, apply knowledge and re attempt tasks (based on feedback given), behaviors that are associated with higher order learning. Based on the above, it can be said that the multimedia provides multiple ways for learning as well as teaching not only for social sciences but other subject areas also.

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